

What is claimed is:

1. A composition for use in powder metallurgy comprising a mixture of a metal powder, a polar powder and a solid lubricant system distributed throughout said mixture, at least a portion of said solid lubricant system converting to a liquid phase upon application of pressure to said composition.
2. A composition as set forth in claim 1 wherein said polar powder comprises a fine powder selected from the group consisting of a graphite containing powder, a molybdenum containing powder, a boron containing powder and a nickel containing powder.
3. A composition as set forth in claim 1 comprising from about 0.10 to about 0.50 percent by weight of said lubricant system.
4. A composition as set forth in claim 1 wherein said polar powder comprises a graphite powder.
5. A composition as set forth in claim 1 wherein said lubricant system comprises a fatty acid material and a guanidine material.
6. A composition as set forth in claim 1 wherein said lubricant system comprises a guanidine material.
7. A composition as set forth in claim 1 wherein said lubricant system comprises a synthetic wax and a fatty acid ester.
8. A composition as set forth in claim 1 wherein said lubricant system includes an amide wax.
9. A composition as set forth in claim 3 wherein said fatty acid material comprises stearic acid.

10. A composition as set forth in claim 6 wherein said guanidine material comprises guanidine stearate.

11. A composition as set forth in claim 6 wherein said guanidine material comprises guanidine ethyl-hexonate.

12. A composition as set forth in claim 6 wherein said guanidine material comprises a mixture of guanidine stearate and guanidine ethyl-hexonate.

13. A solid lubricant system for use in the production of metal powder compacted parts, said solid lubricant system including a polar powder, said lubricant system being capable of forming a liquid phase upon application of pressure.

14. A solid lubricant system as set forth in claim 13 wherein said lubricant system is attracted to said polar powder.

15. A solid lubricant system as set forth in claim 13 wherein said polar powder comprises a fine powder selected from the group consisting of a graphite containing powder, a molybdenum containing powder, a boron containing powder and a nickel containing powder.

16. A solid lubricant system as set forth in claim 13 that displays a viscosity of from about 1000 to about 6000 poise at a shear rate of 1000^{-1} /second.

17. A method of forming a metal part with improved density comprising the steps of:

(i) providing a composition comprising a mixture of metal powder, a polar powder and a solid lubricant system; and

(ii) placing said composition in a mold having a cavity formed therein formed by mold walls; and

(iii) applying pressure to said composition contained within said cavity to form a green part and convert at least a portion of said solid lubricant system to a liquid lubricant; and

(iv) removing said green part from said mold; and

(v) sintering said green part and forming a finished part.

18. A method as set forth in claim 17 wherein during said step (iii) said polar powder migrates to any pores within said green part.

19. A method as set forth in claim 17 wherein during said step (iii) said polar powder migrates to the mold wall.

20. A method as set forth in claim 18 wherein during said step (v) said polar powder promotes liquid phase sintering at said pores.

21. A method as set forth in claim 18 wherein said polar powder comprises a fine powder selected from the group consisting of a boron containing powder, a graphite containing powder, a nickel containing powder and a molybdenum containing powder.

22. A master mix for use in powder metallurgy comprising metal powder, a polar powder and at least 1% by weight of a lubricant system, said lubricant system being capable of converting at least in part to a liquid phase upon subsequent let down of said master mix and pressing of said let down master mix.